

APPENDIX 2

Stationary Source Control Options

Overview

The proposed NO_x controls in NR 428 include performance standards for new and existing sources, with provision for corporate system-wide averaging of emissions for the electric utility facilities located in and directly affecting the ozone nonattainment counties in eastern Wisconsin. Performance standards are set by fuel type, and by combustion unit type and size. The proposed corporate system-wide averaging provides for a simplified trading program as a compliance tool for sources adopting adequate NO_x emission monitoring and tracking systems. The structure also provides for inter-system trades between entities with facilities subject to similar control targets.

For the purposes of this plan, Wisconsin has been divided into two “ozone control regions” and one “ozone maintenance region” in order to define and apply controls to a level and in a time-frame commensurate with their general contribution to the ozone attainment problem. The current proposal includes performance standards for new and existing sources in the Primary Ozone Control Region including the 9 counties in southeastern Wisconsin designated as severe, serious or moderate nonattainment areas under the Clean Air Act.

To maintain compliance with the 1-hour ozone standard after 2007, emission performance standards are proposed for new, significantly modified, rebuilt and relocated NO_x sources in the Secondary Ozone Control Region and are set to a level that limits incremental NO_x growth. Along with these limits, new sources will be required to obtain NO_x offsets of 1:1 (or greater).

Proposed NO_x control “options” in the Primary Control Region for the intermediate milestone years of 2002 and 2005 range from a modest control effort focused on a broad range of sources to a robust control effort that reflects a strong commitment by a small number of the largest NO_x sources. Application of controls to a broader population of sources would be among the most cost-effective options as they are directed at operating efficiency and combustion improvement rather than catalyst-based post-combustion NO_x control.

The draft plan released in April 2000 proposed performance-based controls for the purpose of attainment and maintenance on all existing large NO_x sources in the Primary and Secondary Ozone Control regions. That 30 county area stretches from Grant in the southwest, diagonally northeastward to Brown County and the additional counties to the south and east. To respond to feedback provided on the April draft plan, the current proposal reflects the application of existing facility performance standards to only the Primary Ozone Control Region.

System Average NO_x Emission Limits for Large Utility Sources

A principle NO_x reduction component of the earlier phases of the NO_x Control Plan are “system” or “corporate” average emission rate limits for large utility units in the Primary Control Region as defined in table 2-1. These rates are calculated on an average ozone

season day basis and reflect the proportionate contribution of all the affected units under a single entity's control. The emission rate in the final ROP year (2007) is suggested to range from 0.22-0.27 lbs/mmbtu average. Options are delineated to vary this target rate in all three progress milestone years – 2002, 2005 and 2007. The least restrictive rate anticipated as an average is 0.30 lbs/mmbtu for 2002, 0.28 lbs/mmbtu for 2005, and 0.27 lbs/mmbtu for 2007 for the core control region. Each of the options delineated accounts for the required sliding 3% ROP contingency component as part of the core plan.

In the proposal, inter-system NOx credit trading is considered a basic compliance option. Buyer and seller credits need to be calculated on an equivalent basis to ensure that the ROP reduction objectives are met and most such “trades” would be based on monitoring conducted according to 40CFR75. The trading currency ensures that an equivalent mass of NOx is reduced whether based on intra-system or inter-system exchanges.

Table 2-1. Electric Utility Corporate Average Emission Rates

Source Category	Ozone Season Average Emission Rate	Basis for Requirement	Monitoring Requirement
Electric Utility Boilers => 500 mmbtu/hr	2002 – 0.24 to 0.30 lbs/mmbtu* 2005 – 0.23 to 0.28 lbs/mmbtu* 2007 – 0.22 to 0.27 lbs/mmbtu*	ROP Reductions	40CFR75

* Target average emission rate is dependent on ROP option and incorporates a 3% contingency component.

Emission Performance Standards for New and Existing NOx Sources

Another component of the NOx Control Plan is a series of Emission Performance Limits for new and existing sources. These standards are designed to set a simple NOx reduction objective consistently across the boiler and combustion source populations in the areas that impact unhealthy ozone concentrations. These performance standards are anticipated to provide a cost saving in many applications while reducing aggregate NOx levels.

The existing facility standards are proposed to apply beginning in 2002. Options in the ROP plans show full the impact of full implementation in each ROP year, however, a staging of standards could potentially be pursued to target the most appropriate reductions through 2007 and the summary table shows a 2005 option. The standards represent one of the recommended means for maintaining a zero NOx growth planning objective for that part of Wisconsin. The proposed standards require adequate monitoring to allow emission rate averaging of affected units based on monitoring conducted under 40CFR60 (except for units where 40CFR75 monitoring is already required). Facilities or units affected by optimization or tuning requirements require adequate monitoring to ensure proper combustion operation. The proposed compliance date is May 1, 2002, however, a noted option is to phase-in the standards through 2007.

The standards for new facilities, and newly refurbished or relocated sources, help ensure maintenance of the ozone standard into the future while ensuring that air quality problems associated with longer averaging periods (ozone, PM and haze) are not made worse as new facilities are located in Wisconsin. The new facility standards would not affect facilities subject to the typically more restrictive control requirements of the New Major Source (NSR) and Prevention of Significant Deterioration (PSD). These standards

would apply to facilities falling below those programs' source size or potential-to-emit thresholds. For the Lake Michigan region, these standards are important because the area maintains its formal NSR exemption for NO_x for the ozone nonattainment counties. New sources are required to pursue continuous or periodic monitoring based on 40CFR60 requirements as appropriate to ensure compliance with applicable emission rates. Under the proposal, these limits would become enforceable in 2001.

Offsetting NO_x Emissions

Another component of this plan is an ozone season 1-to-1 emissions offset requirement for new sources in the Primary and Secondary Ozone Control Regions. The offsets must meet the regular criteria including being excess to the NO_x reduction levels established under this plan for either a facility or system requirement.

Table 2-2. Performance Standards for Existing Stationary Sources

Source Category	Requirement (1)	Basis for Requirement	Monitoring Requirement
Combustion Modification Based Limits			
Solid Fuel Fired Boilers => 100 mmbtu/hr (units < 25% CF exempt):			
Cyclone	0.45 lbs/mmbtu	OFA / Optimization	Part 60
Stoker	0.25 lbs/mmbtu	Existing OFA-Modification / Optimization	Part 60
Fluidized Bed	0.15 lbs/mmbtu	Existing OFA-Modification / Optimization	Part 60
Pulverized Coal	0.30 lbs/mmbtu	Low Nox Burner / Optimization	Part 60
Gas/Oil Fired Boilers => 100 mmbtu/hr (units < 25% CF exempt)	0.10 lbs/mmbtu	Low Nox Burner / Optimization	Part 60
Reheat, Annealing, Galvanizing Furnaces => 100 mmbtu/hr (units < 25% CF exempt)	0.10 lbs/mmbtu	Low Nox Burner / Optimization	Part 60
Glass Furnace => 250 mmbtu/hr	6.0 lbs/ton pulled glass	Hot Air Staging / Optimization	Part 60
Combustion Turbines => 50 MW	Gas: 75 ppm Oil: 110 ppm	Dry Low NOx Burners	Part 60
Reciprocating Engines => 2000 hp	Rich burn9.5 gr/bhp Lean burn.....10.0 gr/bhp Distillate fuel.....8.5 gr/bhp Dual fuel.....6.0 gr/bhp	Spark Ignition Air/Fuel Adjustment Compression Ignition Ignition Timing Retard	Part 60
GOOD COMBUSTION PRACTICE – minimum requirements			
Solid Fuel Boilers => 50 mmbtu/hr (units < 15% CF exempt)	NOx Optimization	Low Excess Air	C.A. - cont
Gas/Oil Fired Boilers > 50 mmbtu/hr (units < 20% CF exempt)	NOx Optimization	Low Excess Air	C.A. - cont
Cement and Lime Kilns and Calciners => 50 mmbtu/hr	NOx Optimization	Low Excess Air	C.A. - cont
Reheat, Annealing, Galvanizing Furnaces => 50 mmbtu/hr	NOx Optimization	Low Excess Air	C.A. - cont
Glass Furnaces (units < 25% CF exempt)	NOx Optimization	Low Excess Air	C.A. - cont
Gas/Oil Fired Process Heaters, Dryers, Ovens, and Asphalt Plants => 50 mmbtu/hr	Tune-up	Low Excess Air	C.A. – per.
Boilers < 50 mmbtu/hr	Tune-up	Low Excess Air	C.A. – per.
Combustion Turbines =>10 MW	Tune-up	Low Excess Air	C.A. – per.
Reciprocating Engines => 500 hp	Tune-up	Low Excess Air	C.A. – per.

Table 2-3. New Source Performance Standards

Source Category	Applicable Threshold	Requirement	Minimum Monitoring
Solid Fuel Fired Boilers	=> 250 mmbtu/hr	0.15 lbs/mmbtu	Part 60
Solid Fuel Fired Boilers	< 250 mmbtu/hr	0.20 lbs/mmbtu	Part 60
Oil Fired Boilers	=> 25 mmbtu/hr	0.07 lbs/mmbtu	Part 60
Gas Fired Boilers	=> 25 mmbtu/hr	0.035 lbs/mmbtu	Part 60
Recovery Boilers	NA	0.10 lbs/mmbtu	Part 60
Cement Kilns, Lime Kilns, and Calciners	NA	0.10 lbs/mmbtu	Part 60
Reheat, Annealing, Galvanizing Furnaces	=> 50 mmbtu/hr	0.10 lbs/mmbtu	Part 60
Glass Furnaces	=> 50 mmbtu/hr	4 tons/ ton pulled glass	Part 60
Gas/Oil Fired Process Heaters, Dryers, Ovens, Asphalt Plants and other external combustion sources	=> 50 mmbtu/hr	0.1 lbs/mmbtu	Part 60
Combustion Turbines	=> 10 MW < 10 MW	Gas 9 ppm Oil: 25 ppm Gas: 42 ppm Oil: 65ppm	Part 60
Combined Cycle Turbines	=> 10 MW < 10 MW	Gas 3 ppm Oil: 8 ppm Gas: 14 ppm Oil: 21ppm	Part 60
Reciprocating Engines	Rich-Burn => 1000 hp Lean Burn => 1000 hp Distillate Fuel =>1800 hp Dual Fuel => 2000 hp	2.5 gr/bhp 3.0 gr/bhp 2.5 gr/bhp 2.5 gr/bhp	Part 60

Table 2-2 & 2-3 Footnotes**Definitions:**

CF – Unit capacity factor or percent utilization on an annual basis. (Actual Heat Input / [unit maximum capacity x 8760 hrs/yr])

Low Excess Air - Operating the unit under conditions of low excess air

Optimization – Performing an optimization study to minimize NOx emissions.

Monitoring Requirements:

“Part 75” – 40CFR75 Mass-based monitoring or equivalent is required for trading and ROP determination.

“Part 60” – 40CFR60 Continuous NOx rate monitoring or equivalent parametric monitoring is required to determine compliance with emission rate limits, to aid in continual unit optimization, and rate averaging of units.

“C.A. cont”, C.A. per” – Periodic NOx or parametric monitoring using combustion analyzer monitoring equipment and fuel consumption recording.